





# Limiting Conditions/Risk Factors

Site and Soil Evaluation for Sewage Treatment and Disposal

County: \_\_\_\_\_ Land Use / Vegetation: \_\_\_\_\_  
 Township: \_\_\_\_\_ Location: \_\_\_\_\_  
 Property Address: \_\_\_\_\_ Position on Location: \_\_\_\_\_  
 Applicant Name: \_\_\_\_\_ Project Name: \_\_\_\_\_  
 Address: \_\_\_\_\_ Shape of Site: \_\_\_\_\_  
 Phase: \_\_\_\_\_ Date: \_\_\_\_\_ Certification Stamp or Certificate #: \_\_\_\_\_  
 Evaluator: \_\_\_\_\_ Signature: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Latitude/Longitude: \_\_\_\_\_  
 Method: \_\_\_\_\_

Soil Profile		Estimating Soil Parameters				Estimating Soil Permeability										Other Soil Features
Station	Depth (feet)	Moisture (%)	Chromatographic Consistency	Plasticity	Clay	Approx. % Clay	Approx. % Clay	Grade	Size	Type	Consistency	Other	Notes	Other	Notes	

Limiting Conditions: \_\_\_\_\_  
 Remarks - Risk Factors: \_\_\_\_\_

Note: The evaluation shall include a complete site plan or site drawing including all requirements in paragraphs (B)(1) through (B)(4) of OAC 150-29-08.

# Limiting Condition/Risk Factors

- Intended to summarize soil description and capture critical information as it relates to the performance of the system.
- Points out certain issues and areas of concern to those evaluating the description.

## Site and Soil Evaluation for Sewage Treatment and Disposal

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Soil Profile		Estimating Soil Parameters				Estimating Soil Permeability										Other Soil Features
Station	Depth (feet)	Moisture (%)	Chromatographic Consistency	Plasticity	Clay	Approx. % Clay	Approx. % Clay	Grade	Size	Type	Consistency	Other	Notes	Other	Notes	
Ag	0-11	10/8 43	NA	NA	Silt Loam	22	2	1	M	SBK	FI					
Bg	11-18	10/8 42	10% 10/8 R 1.2	10%	Shale is Draped Silty Clay Loam	39	2	2	M	SBK	FI					
Ht	18-27	10/8 46	10% 10/8 R 1.2	10%	Clay	43	2	2	M	SBK	FI					
BC	27-31	10/8 44	10% 10/8 R 1.2	10%	Clay Loam	33	3	1	M	SBK	FI					
Cl	31-44	10/8 41	10% 10/8 R 1.2	10%	Loam	26	3	0	NA	MEA	VFI					

Limiting Conditions: \_\_\_\_\_  
 Remarks - Risk Factors: \_\_\_\_\_

Note: The evaluation shall include a complete site plan or site drawing including all requirements in paragraphs (B)(1) through (B)(4) of OAC 150-29-08.

## Site and Soil Evaluation for Sewage Treatment and Disposal

County: \_\_\_\_\_ Land Use / Vegetation: \_\_\_\_\_  
 Township: \_\_\_\_\_ Location: \_\_\_\_\_  
 Property Address: \_\_\_\_\_ Position on Location: \_\_\_\_\_  
 Applicant Name: \_\_\_\_\_ Project Name: \_\_\_\_\_  
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Soil Profile		Estimating Soil Parameters				Estimating Soil Permeability										Other Soil Features
Station	Depth (feet)	Moisture (%)	Chromatographic Consistency	Plasticity	Clay	Approx. % Clay	Approx. % Clay	Grade	Size	Type	Consistency	Other	Notes	Other	Notes	
Ag	0-12	10/8 43	NA	NA	Silt Loam	22	2	1	M	SBK	FI					
Bt	12-37	10/8 46	NA	NA	Silt Clay Loam	36	2	2	M	SBK	FI					
Bt	37-51	7/8 R 46	NA	NA	Clay	42	3	2	M	SBK	FI					
Bt	51-56	7/8 R 46	NA	NA	Clay	46	4	2	M	SBK	FI					
Bt	56-63	10/8 46	NA	NA	Clay	46	4	2	M	SBK	FI					
C	63-68	10/8 43	NA	NA	Clayey Loam	36	3	0	NA	SBK	EXP					

Limiting Conditions: \_\_\_\_\_  
 Remarks - Risk Factors: \_\_\_\_\_

Note: The evaluation shall include a complete site plan or site drawing including all requirements in paragraphs (B)(1) through (B)(4) of OAC 150-29-08.

# What are Soil Loading Rates?

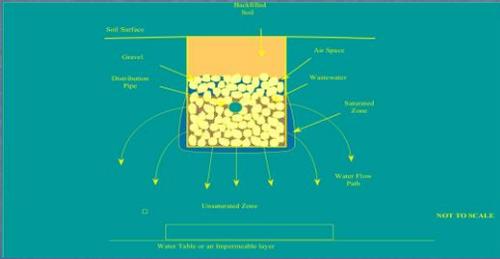
- A measurement of how fast we can expect water to move into and through the soil. (2 different rates)
  - Infiltration Loading Rate
  - Linear Loading Rate

# Infiltration Loading Rate

- The rate wastewater enters the soil, which is limited by clogging layers and controlled by the nature of both the clogging layer and the soil.
- Clogging layers impede water infiltration and reduce loading below maximum rate of unclogged soil.

Tyler and Converse 1984, Bouma 1975

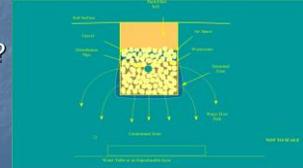
### Infiltration Loading Rate



Sketch by - Dr. David Lindbo - NCSU

### Infiltrative Loading Rate

- Infiltration - Measure of how fast water enters soil from the surface. (or entry point)
- Saturated flow?



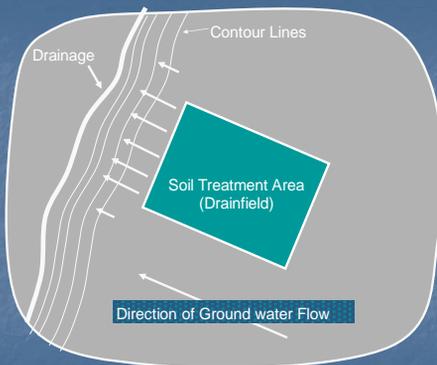
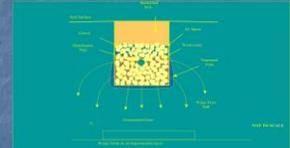
### Hydraulic Linear Loading Rates

- The volume of wastewater that the soil surrounding a wastewater infiltration system can transmit far enough away from the infiltration surface such that it no longer influences the infiltration of additional wastewater.

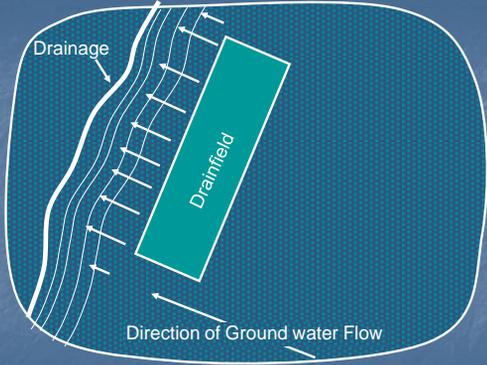
■ Tyler and Converse 1984

### Hydraulic Linear Loading Rates

- Percolation - The rate of water movement "within" the soil profile.
- Unsaturated Flow.



Sketch by - Dr. David Lindbo - NCSU



Sketch by - Dr. David Lindbo - NCSU

## Soil Properties that Affect Water Movement

- Texture
- Structure
- Consistence



## Loading Rate Table

- Ohio has been using the 2000 E. Jerry Tyler Table
- Sewage Rule Advisory Committee has proposed a loading rate table specifically for Ohio. Modified after Tyler, 2006.

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Soil Characteristics	Soil Infiltration Loading Rate (gpd/ft <sup>2</sup> )			
	Structure	CBOD <sub>5</sub>	TSS	Rate
Texture	Shape	Grade	Depth (inches)	Permeability (ft/day)
COL, S, LOOS, LS	---	SSD	0.4	1
FS, WS, LFS, LWS	---	SM	0.2	0.8
COL, SL	PL	1	0.2	0.3
	PREMOR	1	0.4	0.7
	SM	0	0	0
FSL, WSL	PL	1, 2, 3	0.2	0.3
	PREMOR	1	0.4	0.7
	SM	0	0	0
L	PL	1, 2, 3	0.4	0.8
	PREMOR	1	0.8	1.6
	SM	0	0	0
SL	PL	1, 2, 3	0.8	1.6
	PREMOR	1	1.6	3.2
	SM	0	0	0
SCL, CL, SICL	PL	1, 2, 3	0.4	0.8
	PREMOR	1	0.8	1.6
	SM	0	0	0
SCL, C, SIC	PL	1, 2, 3	0.8	1.6
	PREMOR	1	1.6	3.2
	SM	0	0	0

Soil Characteristics	Hydraulic Linear Loading Rate (gpd/ft <sup>2</sup> )					
	Structure	Slope 5-8%	Slope 8-10%	Slope 10-14%	Slope 14-18%	Slope 18-24%
Texture	Structure	Infiltration Distance (feet)				
COL, S, LOOS, LS	---	8-12	10-16	14-20	18-24	24-30
FS, WSL, LFS, LWS	---	8-12	10-16	14-20	18-24	24-30
COL, SL	PL	1	1.5	4.5	5.5	4.5
	PREMOR	1	3.0	9.0	11.0	9.0
	SM	0	0	0	0	0
FSL, WSL	PL	1	1.5	4.5	5.5	4.5
	PREMOR	1	3.0	9.0	11.0	9.0
	SM	0	0	0	0	0
L	PL	1	3.0	9.0	11.0	9.0
	PREMOR	1	6.0	18.0	22.0	18.0
	SM	0	0	0	0	0
SL	PL	1	6.0	18.0	22.0	18.0
	PREMOR	1	12.0	36.0	44.0	36.0
	SM	0	0	0	0	0
SCL, CL, SICL	PL	1	3.0	9.0	11.0	9.0
	PREMOR	1	6.0	18.0	22.0	18.0
	SM	0	0	0	0	0
SCL, C, SIC	PL	1	6.0	18.0	22.0	18.0
	PREMOR	1	12.0	36.0	44.0	36.0
	SM	0	0	0	0	0

## RAC Recommendations

- Retain the 120 gallons/day/bedroom design flow with no adjustments to loading rates.

## Infiltration Loading Rate

(1) Soil infiltration loading rates, including basal loading rates for sand fill systems, shall be based on effluent quality and on soil structure, grade and shape, texture, and consistence and shall be determined through reference to soil evaluation information and the loading rate estimates in table 3 of this rule.

- The selection of soil loading rates based on effluent quality shall be limited to a rate for septic tank effluent or a rate for pretreated effluent meeting the CBOD<sub>5</sub> and TSS standard under rule 3701-29-14 of the Administrative Code.
- The structure, texture, structural grade and consistence of the most limiting in situ soil layer within six inches of the infiltrative surface, or basal surface if applicable, shall be used to determine a soil loading rate, unless the soil layers below the upper six inches are significantly less permeable.
- The selected soil loading rate for the site shall be used to determine the total square feet of infiltrative surface or basal area required for the soil absorption component. The daily design flow is divided by the selected soil loading rate to calculate the minimum square feet of infiltrative surface area required for soil absorption.

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Soil Characteristics	Soil Infiltration Loading Rate (gpd/ft <sup>2</sup> )			
	Structure	CBOD <sub>5</sub>	TSS	Rate
Texture	Shape	Grade	Depth (inches)	Permeability (ft/day)
COL, S, LOOS, LS	---	SSD	0.4	1
FS, WSL, LFS, LWS	---	SM	0.2	0.8
COL, SL	PL	1	0.2	0.3
	PREMOR	1	0.4	0.7
	SM	0	0	0
FSL, WSL	PL	1, 2, 3	0.2	0.3
	PREMOR	1	0.4	0.7
	SM	0	0	0
L	PL	1, 2, 3	0.4	0.8
	PREMOR	1	0.8	1.6
	SM	0	0	0
SL	PL	1, 2, 3	0.8	1.6
	PREMOR	1	1.6	3.2
	SM	0	0	0
SCL, CL, SICL	PL	1, 2, 3	0.4	0.8
	PREMOR	1	0.8	1.6
	SM	0	0	0
SCL, C, SIC	PL	1, 2, 3	0.8	1.6
	PREMOR	1	1.6	3.2
	SM	0	0	0

# Hydraulic Linear Loading Rate

(2) The HLLR shall be used to determine the minimum required length of the soil absorption component or basal area parallel to surface contours and shall be based on soil characteristics, land slope, site conditions, infiltrative distance, and the nature and depth to limiting conditions.

(a) The HLLR shall be determined based on the soil evaluation information with reference to table 4 to determine the rate based on the soil conditions, slope and infiltrative distance.

(b) The minimum length of the soil absorption component shall be determined by dividing the daily design flow by the hydraulic linear loading rate selected from table 4 of this rule.

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**Table 4. Hydraulic Linear Loading Rate Table**

Soil Characteristics	Structure	Hydraulic Linear Loading Rate (gpd/ft)													
		Single 8"IN Infiltrative Distance			Single 9"IN Infiltrative Distance			Single 10"IN Infiltrative Distance			Single 12"IN Infiltrative Distance				
Texture	Grains	6-12	12-24	24-48	6-12	12-24	24-48	6-12	12-24	24-48	6-12	12-24	24-48	Rate	
COSE & LOOSE LS	--	800	42	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	1
FR. VFL. VFL. LVS	--	800	35	4.5	3.5	4.0	3.0	3.5	3.0	3.5	3.0	3.5	3.0	3.5	1
CIL. SL	PS	1	30	3.5	4.0	3.0	4.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0	1
	FRAGG	1	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
	R	2.3	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
FBL. VFL.	PS	1	30	3.5	4.0	3.0	4.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0	1
	FRAGG	1	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
	R	2.3	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
L	PS	1	30	3.5	4.0	3.0	4.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0	1
	FRAGG	1	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
	R	2.3	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
SL	PS	1	30	3.5	4.0	3.0	4.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0	1
	FRAGG	1	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
	R	2.3	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
SCL. CL. SCL.	PS	1	30	3.5	4.0	3.0	4.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0	1
	FRAGG	1	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
	R	2.3	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
SCL. C. SCL.	PS	1	30	3.5	4.0	3.0	4.5	4.0	3.5	4.0	3.5	4.0	3.5	4.0	1
	FRAGG	1	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1
	R	2.3	35	4.5	5.5	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	1

# Hydraulic Linear Loading Rate - Continued

(c) The soil horizon selected to determine the hydraulic linear loading rate shall also meet the following requirements and may be adjusted as follows with approval from the board of health:

- (i) The most restrictive soil horizon within the infiltrative distance shall be used to determine the HLLR;
- (ii) Low permeability soil horizons located between the infiltrative surface and the limiting condition may be excluded from the calculation of HLLR if the cumulative thickness is less than twenty per cent of the infiltrative distance upon concurrence of the designer and the board of health.
- (iii) Any soil horizon below the depth of the required minimum VSD may be considered to be a limiting condition when selecting the HLLR.

# Hydraulic Linear Loading Rate - Continued

(d) Adjustments to the HLLR for designs shall be considered by the designer and may be required by the board of health based on the following site conditions:

- (i) Where the infiltrative distance is less than eight inches, the HLLR may be decreased to reduce the risk of flooding of the trench bottoms, seepage at the toe of mounds or saturating the soil around drip tubing. Designs shall also consider decreasing the HLLR where the flow restrictive layer, seasonal water table or infiltrative surface is less than eight inches below the original ground surface to reduce the risk of inadequate dispersal of sewage and surfacing of effluent; or
- (ii) When the distance to the limiting condition falls near the boundary between the columns for infiltrative distance on table 4 of this rule, designers and boards of health may choose the appropriate HLLR or modify the HLLR.

# Hydraulic Linear Loading Rate - Continued

(e) HLLR for STS designs with greater than twenty-four inches of in situ soil within the infiltrative distance may be adjusted with concurrence of the designer and the board of health as follows:

- (i) Up to two gallons per day per foot may be added to the selected HLLR value in table 4 of this rule where fractured glacial till is the uppermost limiting condition.
- (ii) Up to three gallons per day per foot may be added to the selected HLLR value in table 4 of this rule where fractured bedrock is the uppermost limiting condition or highly permeable material is present above the limiting condition not to exceed ten gallons per day per foot.
- (iii) Up to three gallons per day per foot may be added to the selected HLLR value in table 4 of this rule where no limiting condition is present within sixty inches of the natural ground surface.

# Hydraulic Linear Loading Rate - Continued

(f) If site and soil conditions indicate horizontal subsurface flow volumes will be greater than normal, the minimum horizontal isolation distances shall be increased in undisturbed areas around the perimeter or downslope of the soil absorption component as necessary for adequate dispersal and prevention of surface seepage.

- (g) A soil absorption component may be split into two or more portions or zones to meet the required HLLR for each portion or zone.
- (h) The calculated length along contour for soil absorption components using the linear loading rates specified in table 4 of this rule can be decreased up to ten per cent for new construction on existing lots upon the effective date of the rules, and up to thirty per cent for replacement sites allow installation based solely on site limitations. Where reductions in length along contour between twenty and thirty per cent are allowed, low pressure or drip distribution of effluent into the soil absorption component shall be required as specified in rule 3701-29-15.1 and appendix

3701-29-15 General soil absorption standards.

(A) Soil absorption components shall be designed to minimize the risk of exposure to sewage effluent, contamination of groundwaters and surface water and pollution of the environment.

(1) Treatment of effluent through infiltration and movement through an adequate thickness of unsaturated soil before the effluent reaches ground water or an aquifer. Signs permeable materials directly connected to groundwater, the infiltration system, the surface, or surface water, and

(2) Disposal of treated effluent in the landscape in present lawns or planting of treated or partially treated effluent.

(B) A site design shall consider site conditions identified in the soil evaluation and design shall ensure the following:

(1) The minimum vertical separation distance, unsaturated in-situ soil, permeable effluent quality and distribution method shall be selected from paragraphs (C), (E), (F), and (G) as determined from the soil evaluation. Table 2 summarizes these requirements.

**Table 2. VSD and in-situ soil requirements**

Paragraph	Limiting Condition	Minimum VSD (inches)	Minimum unsaturated in-situ soil within infiltrative distance (inches)
D	Limiting condition not specified in this table	18	8
(E)(1)	Fractured and/or Karst bedrock	36	12
(E)(2)	Ground water or aquifer	36	12
(E)(3)	Other limiting conditions identified in soil evaluation or by the board of health as having high risk or not meeting 3701-29-15 (A)	36	12
F	Highly weathered soils with weak structure or low to very low permeability developed on the low lime till plains are present	24	8
G	Perched seasonal water if not established by board of health	12	8
G	Perched seasonal water as established by a board of health	6-18	6-18

(C) Except for paragraphs (E), (F), (G) and (H) of this rule, when a seasonal water table is present, the board of health may establish a vertical separation distance no less than six inches and no greater than eighteen inches, with a required minimum thickness of in situ soil within the infiltrative distance of no less than six inches when effluent is discharged to the soil absorption component. Unless otherwise established by the board of health, the vertical separation distance to the seasonal water table shall be twelve inches, and the required minimum thickness of in situ soil beneath the infiltrative surface shall be eight inches when effluent is discharged to the soil absorption component.

(D) A board of health may establish the required minimum vertical separation distance of greater than zero inches and less than six inches, and the required minimum in situ soil thickness within the vertical separation distance of greater than zero inches and less than six inches where the seasonal water table is present and the sewage effluent is pretreated to less than one thousand fecal coliform CFU per one hundred milliliters. The infiltrative surface shall not be placed below the depth of the seasonal water table.

(E) Except for paragraphs (E), (F), (G) and (H) of this rule, when a seasonal water table is present, the board of health may establish a vertical separation distance no less than six inches and no greater than eighteen inches, with a required minimum thickness of in situ soil within the infiltrative distance of no less than six inches when effluent is discharged to the soil absorption component. Unless otherwise established by the board of health, the vertical separation distance to the seasonal water table shall be twelve inches, and the required minimum thickness of in situ soil beneath the infiltrative surface shall be eight inches when effluent is discharged to the soil absorption component.

(F) A board of health may establish the required minimum vertical separation distance of greater than zero inches and less than six inches, and the required minimum in situ soil thickness within the vertical separation distance of greater than zero inches and less than six inches where the seasonal water table is present and the sewage effluent is pretreated to less than one thousand fecal coliform CFU per one hundred milliliters. The infiltrative surface shall not be placed below the depth of the seasonal water table.

(G) Except for paragraphs (E), (F), (G) and (H) of this rule, when a seasonal water table is present, the board of health may establish a vertical separation distance no less than six inches and no greater than eighteen inches, with a required minimum thickness of in situ soil within the infiltrative distance of no less than six inches when effluent is discharged to the soil absorption component. Unless otherwise established by the board of health, the vertical separation distance to the seasonal water table shall be twelve inches, and the required minimum thickness of in situ soil beneath the infiltrative surface shall be eight inches when effluent is discharged to the soil absorption component.

(H) A board of health may establish the required minimum vertical separation distance of greater than zero inches and less than six inches, and the required minimum in situ soil thickness within the vertical separation distance of greater than zero inches and less than six inches where the seasonal water table is present and the sewage effluent is pretreated to less than one thousand fecal coliform CFU per one hundred milliliters. The infiltrative surface shall not be placed below the depth of the seasonal water table.

**Table 2. VSD and in-situ soil requirements**

Paragraph	Limiting Condition	Minimum VSD (inches)	Minimum unsaturated in-situ soil within infiltrative distance (inches)
D	Limiting condition not specified in this table	18	8
(E)(1)	Fractured and/or Karst bedrock	36	12
(E)(2)	Ground water or aquifer	36	12
(E)(3)	Other limiting conditions identified in soil evaluation or by the board of health as having high risk or not meeting 3701-29-15 (A)	36	12
F	Highly weathered soils with weak structure or low to very low permeability developed on the low lime till plains are present	24	8
G	Perched seasonal water if not established by board of health	12	8
G	Perched seasonal water as established by a board of health	6-18	6-18

(D) Except for paragraphs (E), (F) (G) and (H) of this rule, the required minimum vertical separation distance shall be eighteen inches, and the required minimum unsaturated in situ soil thickness within the infiltrative distance shall be eight inches, to all limiting conditions.

**Table 2. VSD and in-situ soil requirements**

Paragraph	Limiting Condition	Minimum VSD (inches)	Minimum unsaturated in-situ soil within infiltrative distance (inches)
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F	Highly weathered soils with weak structure or low to very low permeability developed on the low lime till plains are present	24	8
G	Perched seasonal water if not established by board of health	12	8
G	Perched seasonal water as established by a board of health	6-18	6-18

(E) The required minimum vertical separation distance of thirty-six inches and the required minimum in situ soil thickness of twelve inches within the infiltrative distance shall be required when the following site conditions are present:

(1) Fractured and karst bedrock;

(2) Groundwater or an aquifer; or

(3) Other limiting conditions identified in the soil evaluation or otherwise identified by the board of health as having a high risk of not meeting the requirements of paragraph (A) of this rule.

**Table 2. VSD and in-situ soil requirements**

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F	Highly weathered soils with weak structure or low to very low permeability developed on the low lime till plains are present	24	8
G	Perched seasonal water if not established by board of health	12	8
G	Perched seasonal water as established by a board of health	6-18	6-18

(F) The required minimum vertical separation distance of twenty-four inches, and the required minimum in situ soil thickness of eight inches within the infiltrative distance shall be required to seasonal water table when highly weathered soils with weak structure or low to very low permeability developed on the low lime till plains are present.

**Table 2. VSD and in-situ soil requirements**

Paragraph	Limiting Condition	Minimum VSD (inches)	Minimum unsaturated in-situ soil within infiltrative distance (inches)
D	Limiting condition not specified in this table	18	8
(E)(1)	Fractured and/or Karst bedrock	36	12
(E)(2)	Ground water or aquifer	36	12
(E)(3)	Other limiting conditions identified in soil evaluation or by the board of health as having high risk or not meeting 3701-29-15 (A)	36	12
F	Highly weathered soils with weak structure or low to very low permeability developed on the low lime till plains are present	24	8
G	Perched seasonal water if not established by board of health	12	8
G	Perched seasonal water as established by a board of health	6-18	6-18

(G) Except for paragraph (E) (F) and (H) of this rule, when a seasonal water table is present, the board of health may establish a vertical separation distance no less than six inches and no greater than eighteen inches, with a required minimum thickness of in situ soil within the infiltrative distance of no less than six inches when effluent is discharged to the soil absorption component. Unless otherwise established by the board of health, the vertical separation distance to the seasonal water table shall be twelve inches, and the required minimum thickness of in situ soil beneath the infiltrative surface shall be eight inches when effluent is discharged to the soil absorption component.

(H) A board of health may establish the required minimum vertical separation distance of greater than zero inches and less than six inches, and the required minimum in situ soil thickness within the vertical separation distance of greater than zero inches and less than six inches where the seasonal water table is present and the sewage effluent is pretreated to less than one thousand fecal coliform CFU per one hundred milliliters. The infiltrative surface shall not be placed below the depth of the seasonal water table.

## Soil Depth Credits

(L) Soil depth credits for infiltrative surface elevation, pretreatment pathogen reduction, low pressure distribution and/or timed micro-dosed distribution shall be used as follows and in accordance with this chapter:

(1) A one-to-one equivalency soil depth credit shall apply to soil absorption components that elevate the infiltrative surface above the ground surface to meet the required VSD through the use of sand fill material as specified in appendix B to rule 3701-29-15 of the Administrative Code, or other materials as approved by the director.





### Site and Soil Evaluation for Sewage Treatment and Dispersal

Client: \_\_\_\_\_ Land Use / Vegetation: \_\_\_\_\_  
 Title: \_\_\_\_\_ Location: \_\_\_\_\_  
 Project Address: \_\_\_\_\_ Position on Location: \_\_\_\_\_  
 Applicant Name: \_\_\_\_\_ Project Stage: \_\_\_\_\_  
 Address: \_\_\_\_\_ Slope of Site: \_\_\_\_\_  
 Date: \_\_\_\_\_ Date: \_\_\_\_\_  
 Site No: \_\_\_\_\_ Evidence: \_\_\_\_\_  
 Latitude/Longitude: \_\_\_\_\_ Job Number: \_\_\_\_\_

Soil Profile				Soil Characteristics										
Profile	Depth (feet)	Moisture	Color	Consistency	Texture	Clay	Organic %	Plasticity	Shrinkage	Swell	Unit Weight	Moisture	Temperature	Other Soil Features
Ap	0-14	11YR 4/3	5N	SA	SA	10	3	2	3	3	1.2	18	68	FR
Bq1	14-22	10YR 5/2	5YR 10/6	Moist to dry	Clay	40	2	2	3	3	1.3	18	FR	
Bq2	22-30	10YR 5/2	5YR 10/6	Moist to dry	Clay	40	2	2	3	3	1.3	18	FR	
Bc	30-38	10YR 4/4	5YR 10/6	Moist to dry	Clay Loam	35	1	1	3	3	1.3	18	FR	
Cs	38-40	10YR 4/4	5YR 10/6	Moist to dry	Loam	25	1	0	3	3	1.2	18	FR	

Note: The illustration shall include a complete site plan or site drawing including all requirements in paragraphs (B)(1) through (B)(5) of DAC 1701-20-06. CDH - December 2009

## Considerations for Design

- LHD adopted 12" VSD to water table
- VSD 18" to dense till

### Site and Soil Evaluation for Sewage Treatment and Dispersal

Client: \_\_\_\_\_ Land Use / Vegetation: \_\_\_\_\_  
 Title: \_\_\_\_\_ Location: \_\_\_\_\_  
 Project Address: \_\_\_\_\_ Position on Location: \_\_\_\_\_  
 Applicant Name: \_\_\_\_\_ Project Stage: \_\_\_\_\_  
 Address: \_\_\_\_\_ Slope of Site: \_\_\_\_\_  
 Date: \_\_\_\_\_ Date: \_\_\_\_\_  
 Site No: \_\_\_\_\_ Evidence: \_\_\_\_\_  
 Latitude/Longitude: \_\_\_\_\_ Job Number: \_\_\_\_\_

Soil Profile				Soil Characteristics										
Profile	Depth (feet)	Moisture	Color	Consistency	Texture	Clay	Organic %	Plasticity	Shrinkage	Swell	Unit Weight	Moisture	Temperature	Other Soil Features
Ap	0-14	11YR 4/3	5N	SA	SA	10	3	2	3	3	1.2	18	68	FR
Bq1	14-22	10YR 5/2	5YR 10/6	Moist to dry	Clay	40	2	2	3	3	1.3	18	FR	
Bq2	22-30	10YR 5/2	5YR 10/6	Moist to dry	Clay	40	2	2	3	3	1.3	18	FR	
Bc	30-38	10YR 4/4	5YR 10/6	Moist to dry	Clay Loam	35	1	1	3	3	1.3	18	FR	
Cs	38-40	10YR 4/4	5YR 10/6	Moist to dry	Loam	25	1	0	3	3	1.2	18	FR	

Note: The illustration shall include a complete site plan or site drawing including all requirements in paragraphs (B)(1) through (B)(5) of DAC 1701-20-06. CDH - December 2009

## Options for example 2

- Shallow trench
- Engineered drainage
- Depth credits
  - Pretreatment – (would need <1000 CFU)
  - Low pressure distribution – (6" depth credit and sizing reduction)

### ILR Site and Soil Evaluation for Sewage Treatment and Dispersal

Client: \_\_\_\_\_ Land Use / Vegetation: \_\_\_\_\_  
 Title: \_\_\_\_\_ Location: \_\_\_\_\_  
 Project Address: \_\_\_\_\_ Position on Location: \_\_\_\_\_  
 Applicant Name: \_\_\_\_\_ Project Stage: \_\_\_\_\_  
 Address: \_\_\_\_\_ Slope of Site: \_\_\_\_\_  
 Date: \_\_\_\_\_ Date: \_\_\_\_\_  
 Site No: \_\_\_\_\_ Evidence: \_\_\_\_\_  
 Latitude/Longitude: \_\_\_\_\_ Job Number: \_\_\_\_\_

Soil Profile				Soil Characteristics										
Profile	Depth (feet)	Moisture	Color	Consistency	Texture	Clay	Organic %	Plasticity	Shrinkage	Swell	Unit Weight	Moisture	Temperature	Other Soil Features
Ap	0-14	11YR 4/3	5N	SA	SA	10	3	2	3	3	1.2	18	68	FR
Bq1	14-22	10YR 5/2	5YR 10/6	Moist to dry	Clay	40	2	2	3	3	1.3	18	FR	
Bq2	22-30	10YR 5/2	5YR 10/6	Moist to dry	Clay	40	2	2	3	3	1.3	18	FR	
Bc	30-38	10YR 4/4	5YR 10/6	Moist to dry	Clay Loam	35	1	1	3	3	1.3	18	FR	
Cs	38-40	10YR 4/4	5YR 10/6	Moist to dry	Loam	25	1	0	3	3	1.2	18	FR	

Note: The illustration shall include a complete site plan or site drawing including all requirements in paragraphs (B)(1) through (B)(5) of DAC 1701-20-06. CDH - December 2009

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### Table 3. Soil Infiltration Loading Rates

Soil Characteristics	Soil Infiltration Loading Rate (gpd/ft)			
	Texture	Structure	Shrinkage	CBR (%)
COA, S, LOOS, LS	—	SSS	0.8	1.0
FS, WS, LFS, LVS	—	SSS	0.4	1.1
CSL, SL	—	SM	0.2	0.8
	—	PS	0.2	0.5
	—	PS	0.4	0.7
	—	PS	0.8	1.1
FSL, WSL	—	SM	0.2	0.5
	—	PS	0.2	0.8
	—	PS	0.4	0.8
	—	PS	0.8	1.1
L	—	SM	0.2	0.5
	—	PS	0.2	0.8
	—	PS	0.4	0.8
	—	PS	0.8	1.1
SCL	—	SM	0.2	0.5
	—	PS	0.2	0.8
	—	PS	0.4	0.8
	—	PS	0.8	1.1
SCL, CL, SICL	—	SM	0.2	0.5
	—	PS	0.2	0.8
	—	PS	0.4	0.8
	—	PS	0.8	1.1
SC, S, SIC	—	SM	0.2	0.5
	—	PS	0.2	0.8
	—	PS	0.4	0.8
	—	PS	0.8	1.1

## HLLR Site and Soil Evaluation for Sewage Treatment and Dispersal

County: \_\_\_\_\_ Land Use: Vegetation \_\_\_\_\_  
 Township: \_\_\_\_\_ Location: \_\_\_\_\_  
 Project Address/Location: \_\_\_\_\_ Parcel No.: \_\_\_\_\_  
 Applicant Name: \_\_\_\_\_ Permit Stage: \_\_\_\_\_  
 Address: \_\_\_\_\_ Lot Size: \_\_\_\_\_  
 Phone #: \_\_\_\_\_ Date: \_\_\_\_\_  
 City: \_\_\_\_\_ Evaluator: \_\_\_\_\_  
 Lateral/Longitudinal: \_\_\_\_\_ Station: \_\_\_\_\_

Conditioning Stage or Conditions #: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Permit: \_\_\_\_\_

Soil Profile				Evaluating Soil Infiltration				Evaluating Soil Permeability				Structure				Other Soil Features					
Profile	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description
Ap	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3
Bpt	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2
BC	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1
C4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4

Notes: The evaluation shall include a complete soil plan or site drawing including all requirements in paragraphs (3)(c) through (3)(g) of DAC 1701-29-06. CDH - December 2009

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### HLLR Site and Soil Evaluation for Sewage Treatment and Dispersal

County: \_\_\_\_\_ Land Use: Vegetation \_\_\_\_\_  
 Township: \_\_\_\_\_ Location: \_\_\_\_\_  
 Project Address/Location: \_\_\_\_\_ Parcel No.: \_\_\_\_\_  
 Applicant Name: \_\_\_\_\_ Permit Stage: \_\_\_\_\_  
 Address: \_\_\_\_\_ Lot Size: \_\_\_\_\_  
 Phone #: \_\_\_\_\_ Date: \_\_\_\_\_  
 City: \_\_\_\_\_ Evaluator: \_\_\_\_\_  
 Lateral/Longitudinal: \_\_\_\_\_ Station: \_\_\_\_\_

Conditioning Stage or Conditions #: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Permit: \_\_\_\_\_

#### Table 4: Hydraulic Linear Loading Rate Table

Soil Characteristics	Structure	Hydraulic Linear Loading Rate (gpd/ft <sup>2</sup> )							
		Shape	Grade	Soil Code	Soil Description	Soil Code	Soil Description	Soil Code	Soil Description
COE & COE L3	---	---	---	---	---	---	---	---	---
PS, VSL, LFS, LWS	---	---	---	---	---	---	---	---	---
CIL, SL	PL	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
	PRESKOR	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
FSL, VSL	PL	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
	PRESKOR	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
L	PL	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
	PRESKOR	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
SL	PL	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
	PRESKOR	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
SCL, CL, SCL	PL	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
	PRESKOR	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
SC, C, SC	PL	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
	PRESKOR	1	0.2	0.4	0.8	1.6	3.2	6.4	12.8

Notes: The evaluation shall include a complete soil plan or site drawing including all requirements in paragraphs (3)(c) through (3)(g) of DAC 1701-29-06. CDH - December 2009

## Sizing for 5 BR home

- 5 bedroom home (120 gal/bedroom)
- 600/0.6 = 1000 sq/ft
- 600/2.7 = 222 ft trench length.
- 222ft \* 1.5ft = 333sq ft/trench
- 1000/333 = 3 trenches

## ILR Engineered Drainage

County: \_\_\_\_\_ Land Use: Vegetation \_\_\_\_\_  
 Township: \_\_\_\_\_ Location: \_\_\_\_\_  
 Project Address/Location: \_\_\_\_\_ Parcel No.: \_\_\_\_\_  
 Applicant Name: \_\_\_\_\_ Permit Stage: \_\_\_\_\_  
 Address: \_\_\_\_\_ Lot Size: \_\_\_\_\_  
 Phone #: \_\_\_\_\_ Date: \_\_\_\_\_  
 City: \_\_\_\_\_ Evaluator: \_\_\_\_\_  
 Lateral/Longitudinal: \_\_\_\_\_ Station: \_\_\_\_\_

Conditioning Stage or Conditions #: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Permit: \_\_\_\_\_

Soil Profile				Evaluating Soil Infiltration				Evaluating Soil Permeability				Structure				Other Soil Features					
Profile	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description
Ap	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3
Bpt	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2
BC	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1
C4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4

Notes: The evaluation shall include a complete soil plan or site drawing including all requirements in paragraphs (3)(c) through (3)(g) of DAC 1701-29-06. CDH - December 2009

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### Table 3. Soil Infiltration Loading Rates

Soil Characteristics	Structure	Soil Infiltration Loading Rate (gpd/ft <sup>2</sup> )			
		Shape	Grade	Soil Code	Soil Description
COE & COE L3	---	---	---	---	---
PS, VSL, LFS, LWS	---	---	---	---	---
CIL, SL	PL	1	0.2	0.4	0.8
	PRESKOR	1	0.2	0.4	0.8
FSL, VSL	PL	1	0.2	0.4	0.8
	PRESKOR	1	0.2	0.4	0.8
L	PL	1	0.2	0.4	0.8
	PRESKOR	1	0.2	0.4	0.8
SL	PL	1	0.2	0.4	0.8
	PRESKOR	1	0.2	0.4	0.8
SCL, CL, SCL	PL	1	0.2	0.4	0.8
	PRESKOR	1	0.2	0.4	0.8
SC, C, SC	PL	1	0.2	0.4	0.8
	PRESKOR	1	0.2	0.4	0.8

Notes: The evaluation shall include a complete soil plan or site drawing including all requirements in paragraphs (3)(c) through (3)(g) of DAC 1701-29-06. CDH - December 2009

## HLLR Site and Soil Evaluation for Sewage Treatment and Dispersal

County: \_\_\_\_\_ Land Use: Vegetation \_\_\_\_\_  
 Township: \_\_\_\_\_ Location: \_\_\_\_\_  
 Project Address/Location: \_\_\_\_\_ Parcel No.: \_\_\_\_\_  
 Applicant Name: \_\_\_\_\_ Permit Stage: \_\_\_\_\_  
 Address: \_\_\_\_\_ Lot Size: \_\_\_\_\_  
 Phone #: \_\_\_\_\_ Date: \_\_\_\_\_  
 City: \_\_\_\_\_ Evaluator: \_\_\_\_\_  
 Lateral/Longitudinal: \_\_\_\_\_ Station: \_\_\_\_\_

Conditioning Stage or Conditions #: \_\_\_\_\_  
 Signature: \_\_\_\_\_  
 Permit: \_\_\_\_\_

Soil Profile				Evaluating Soil Infiltration				Evaluating Soil Permeability				Structure				Other Soil Features					
Profile	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description	Depth (feet)	Soil Code	Soil Description
Ap	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3	0-14	HYE 4.3	HYE 4.3
Bpt	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2	14-22	HYE 4.2	HYE 4.2
BC	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1	22-30	HYE 4.1	HYE 4.1
C4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4	30-40	HYE 4.4	HYE 4.4

Notes: The evaluation shall include a complete soil plan or site drawing including all requirements in paragraphs (3)(c) through (3)(g) of DAC 1701-29-06. CDH - December 2009

